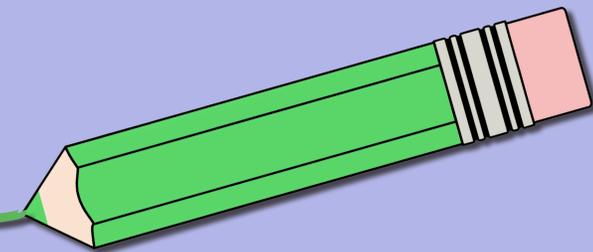


Designing for themselves: Investigating the capability of children with ASD to become effective design partners



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Background

- Children with autism spectrum disorders (ASD) are seldom involved in the design of products and services developed for their use. This may be due to communication difficulties or the extra support required to enable participation.
- The nature and variability of the ASD profile (incorporating relative strengths and weaknesses) suggests that *generic* design principles underpinning the development of products and services may not be extendable to an ASD population.
- An overall research question concerns whether participatory design (PD), a method of actively involving end users in the design process, could provide the means to achieve this goal.
- A secondary research question considers whether existing PD methods developed for typically developing children could also be suitable for use with children who have ASD or if a new specifically adapted PD method would need to be developed for this population.

Objectives

This study aims to assess the utility of PD for use by children with ASD, and involves:

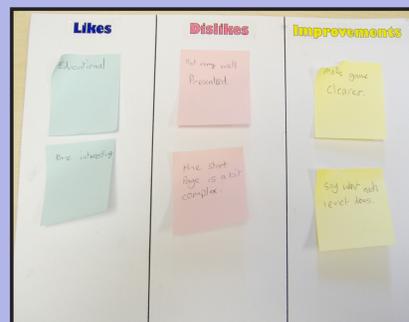
- (1) Investigating whether children with ASD are able to generate their own design ideas for a maths-based computer game.
- (2) Determining whether they can undertake activities associated with existing PD techniques without modification.

Method

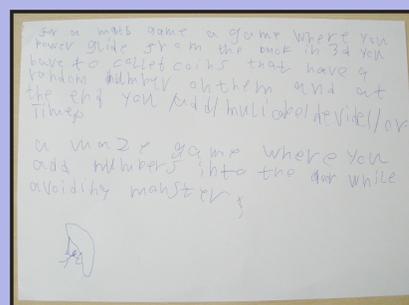
- Twenty high-functioning children with ASD (18 boys, 2 girls), aged 11-15 years used one of two sets of design activities.
- One set was based on activities from an existing PD method for children, Cooperative Inquiry (CI) [1]. A number of other PD methods were analysed, but this method was considered most suited to trial with this population.
- The other set of activities were specifically developed for children with ASD. This new PD method is called IDEAS and is guided by the characteristics of the 'culture of autism' from the TEACCH program [2] to ensure the typical difficulties children with ASD could experience during a PD session are supported appropriately.
- The children took part individually and were matched on age, sex and verbal IQ across the two sets of design activities and originated from three specialist ASD schools.
- Each session involved the children producing an interface design for a maths-based computer game for secondary school children.
- Children who struggled to generate their own designs using IDEAS were given pre-prepared templates that they could then modify or add to.
- Children using CI were not given any additional support.

COOPERATIVE INQUIRY

(Existing PD method for typically developing children)



(1) 'Sticky Notes' - child shown demo of two existing maths-based computer games, then child writes positive/negative feedback on post-it notes.



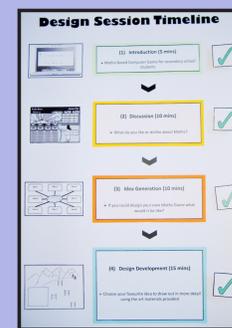
(2) Idea generation - child asked to come up with their own ideas for maths game and then to write/sketch all of their ideas on paper.



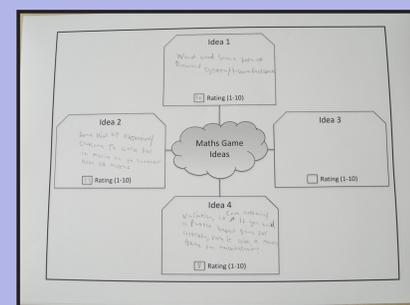
(3) 'Bags of Stuff' - child chooses favourite idea and uses provided art materials to draw out interface design on paper and then describes verbally.

IDEAS

(Newly developed PD method with support for children with ASD)



(1) Session tasks displayed on visual schedule and child can 'tick off' each task. Discussion of previous maths/computer experiences precedes demo. task.



(2) Template provided to support idea generation - it is blank if the child can generate their own ideas or contains example ideas as a prompt if they cannot.



(3) Part-completed template available if child is still struggling with own ideas. Cardboard model provides context for describing final design.

Results

- Seventeen children were able to generate at least one design idea during the design sessions.
- Of the three remaining children, who were unsuccessful, one was using CI and two were using IDEAS.
- Thirteen children were able to generate an original idea that was substantially different to the examples provided during the session.
- Two children were unsuccessful in producing a final design that satisfied the brief of a 'maths-based game', both using the IDEAS method. This was due to their inability (or unwillingness) to incorporate maths into their final interface design.
- Six out of 10 children required the additional template-based support provided in the IDEAS method, either during the idea generation or interface design task.
- The number of ideas across both techniques was comparable overall, but the support offered by IDEAS helped four children successfully produce a final design not possible using CI.

Conclusions

- Children with ASD do have the potential to be involved in the activities typically undertaken during participatory design (PD) sessions.
- Over half the children in this study generated ideas without any support and the majority of children were successful with support.
- Some children clearly have the capability to participate in a full Cooperative Inquiry session, but other children would need additional support, ideally provided through a specially adapted PD method such as IDEAS.
- IDEAS currently supports two aspects of the ASD triad of impairment: (1) *Communication impairments* (specifically a lack of imagination) is supported through the customizable structured template-based support; (2) *Rigid and repetitive behaviours* are discouraged through the use of a visual schedule to actively encourage progression.
- The next step is to further develop the IDEAS method to additionally support any *social impairments* that could affect collaboration to enable this population to successfully work as part of a design team.

References

- [1] Druin, A. Cooperative inquiry: developing new technologies for children with children. *Proc. CHI 1999*, ACM Press, 595-599.
- [2] Mesibov, G.B., Shea, V. and Schopler, E. *The TEACCH approach to autism spectrum disorders*. Springer, New York, 2004.

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